

### ABSTRACT

Active acoustic damping is provided with a motor or similar propulsive element such as a multi-phase brushless direct current (DC) motor. To produce the appropriate canceling effect with the motor, the relationship between the operating mode of the motor and the noise produced is observed. This data can be used to identify a relevant transfer function that can be applied to produce a control signal for the motor. For a multi-phase motor, the current control signals provided to at least one phase may be made asymmetric with respect to the other phases to produce actuating forces upon the motor. This actuating force can be used to modify acoustic signals produced by the motor. The active acoustic damping techniques may be applied in any vehicles or devices, including unmanned underwater vehicles (UUVs), in either an open loop or closed loop manner.